

DISAPPEARANCE OF THE WHITE-WINGED DUCK *CAIRINA SCUTULATA*  
FROM THE PABLAKHALI WILDLIFE SANCTUARY:  
A SAGA OF LARGE-SCALE DESTRUCTION OF MIXED EVERGREEN  
FOREST IN BANGLADESH

(With one text-figure and two plates)

MOHAMMAD ALI REZA KHAN<sup>1</sup>

**Key words:** Bangladesh, Biodiversity Bureau, clear-felling, *jhum* cultivation, monoculture, Kaptai Lake, Pablakhali, Rangamati, tribal insurgency, white-winged duck

Bangladesh used to be a country with rich fauna and flora. During the rule of the British, largely after the 1850s, the first commercial exploitation of natural resources *vis-à-vis* the forests was introduced. This included 'clear-felling' of trees in the Sal Forests of central and northwestern parts, and Semi-evergreen or Mixed Evergreen Forests of north and eastern parts of present Bangladesh. The same tradition was carried forward by the Pakistani authorities who ruled the then East Pakistan (now Bangladesh) from 1947 to 1971. After the independence of Bangladesh, in December 1971, the forest officials kept following their predecessors in destroying forests. Forest destruction became more rampant as the new government had few environmental policy decisions. The situation was further aggravated by lumber poaching, land grabbing, and settling people in the reserved forest areas leading to tribal insurgency. All this ultimately brought an end to the existence of virgin Mixed Evergreen Forest in the northeastern parts of Bangladesh. The white-winged duck *Cairina scutulata* is a victim of this process. This paper examines the process of destruction of the forests and suggests measures to save the remaining habitats of the still surviving biodiversity through the creation of a Wildlife/Biodiversity Bureau separating it completely from the Forest Department that traditionally and wrongly acted against the interests of indigenous wildlife in the past.

INTRODUCTION

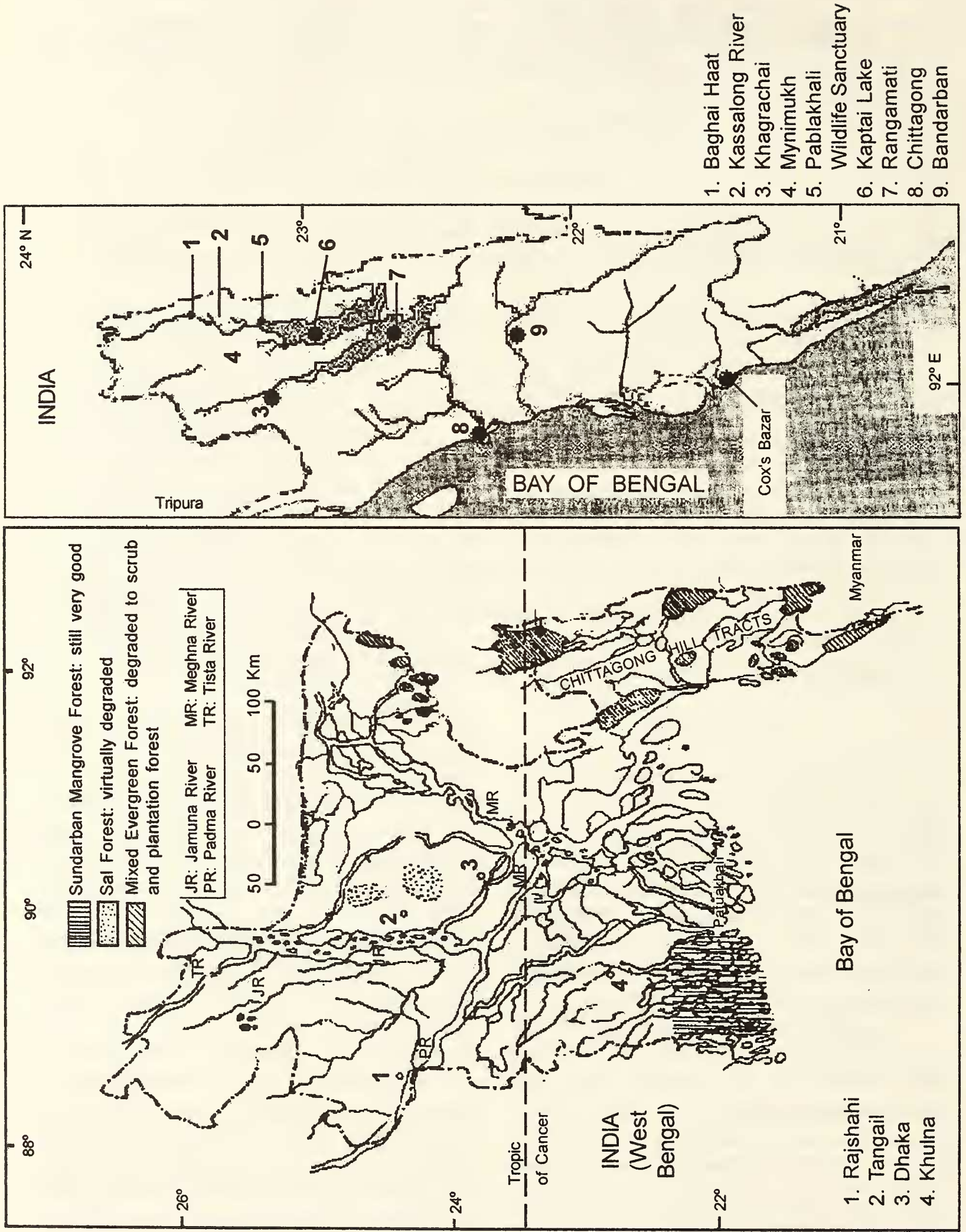
White-winged duck or white-winged wood duck *Cairina scutulata* used to be present in a section of the Mixed Evergreen Forest in the Chittagong Hill Tracts (CHT) District of Bangladesh bordering the Indian State of Mizoram (Husain 1977, 1985, Husain and Haque 1982, Khan 1981, 1983, 1986). These reports were based on observations made prior to 1980. The population was estimated to be 25 birds at that time.

Bangladesh has an area of roughly 147, 570 sq. km and lies between 20° 34' to 26° 38' N and 88° 01' to 92° 41' E. It is bounded on the west, north and east by India, with a small portion of the southeast corner bordering with Myanmar (Fig. 1). The Bay of Bengal covers the entire

southern border. Bangladesh occurs at the confluence of three mighty rivers, the Padma (Ganga), the Brahmaputra and the Meghna, forming one of the largest deltas of the world. It used to have three distinct forest types: Moist Deciduous or Sal, Mixed or Semi-evergreen, and the Mangrove Forest in the Sundarbans (Khan 1982).

Around 1970, the country had roughly 15% land area under forests. However, following independence, in December 1971, there was large-scale systematic removal of forests by the government Forest Department whose main aim was, and possibly still is, to provide revenue to the government exchequer through cutting and selling of forest wood. This was followed by illicit logging, poaching for firewood and illegal conversion of forested land into agricultural fields and human habitations, as well as road building

<sup>1</sup>Dubai Zoo, P.O. Box 67 Dubai, United Arab Emirates.  
Email: makhan@dm.gov.ae; mark1147@emirates.net.ae



1. Baghai Haat
2. Kassalong River
3. Khagrachai
4. Mynimukh
5. Pablakhali
6. Wildlife Sanctuary
7. Kaptai Lake
8. Rangamati
9. Chittagong
9. Bandarban

Fig. 1: Map of Bangladesh showing forest types (left) and Chittagong Hill Tracts (enlarged; right)

and industrial development. There was, and still is, large-scale conversion of forested land into monocultures of commercially viable plant species such as *Tectona grandis*, *Dipterocarpus turbinatus*, *Syzygium grandis*, *Gmelina arborea*, *Hevea brasilensis*, *Hopea odorata*, *Michelia champaca* and *Mesua ferrea*.

Today there is virtually no virgin Sal or Mixed Evergreen Forest in the country other than the Sundarbans Mangrove Forest. In a recent report, IUCN Bangladesh (2000) said that though a current forest inventory is unavailable, it is estimated that the forest cover has been reduced by more than 50% since the 1970s. Estimates in 1990 revealed that Bangladesh has less than 0.02 ha of forest per capita — one of the lowest forest to population ratios in the world. Presently, less than 8% of the country is under forest cover — that too is neither natural nor virgin (Plate 1, Fig. 1).

Bangladesh had its best Mixed Evergreen Forest in the CHT District on the banks of the hill river, Kassalong (Fig. 1). The Kaptai Dam was constructed here to generate hydroelectric power in the 1960s, as a result of which a large portion of the valley forest was inundated. Even then, it had a viable forest with an immense variety of wildlife almost up to 1980, as described in old District Gazetteers and Working Plans of the Forest Department.

After 1980, bloody insurgency reigned, continued up to January 1998 and subsided by February 10 the same year, when tribal insurgents surrendered their arms as per a peace treaty that they signed with the Bangladesh Government. Tribals objected to the settlement of plains-dwelling Bengali people in the hilly areas of the northeast.

Chittagong Hill Tracts District has been bifurcated into Bandarban, Khagrachari and Rangamati Hill Districts in the recent past.

White-winged duck (WWD) used to be present in good numbers in the Pablakhali Wildlife Sanctuary at the heart of Kassalong Valley Forest under the CHT North Forest Division. It is a

threatened species as per BIRDS TO WATCH-2 of BirdLife International (former ICBP - International Council for Bird Preservation) and the IUCN (International Union for Conservation of Nature and Natural Resources) Red Data Book. Also it is in Schedule I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) (Green 1993) and Schedule III of the Bangladesh Wildlife Preservation Act 1973. Bangladesh is a party to the CITES. That means this species cannot be traded, trapped or killed, nationally or internationally.

#### HABITAT SURVEY

I conducted a field survey of the known habitats of the WWD from August 15 to 21, 2000, when a wildlife researcher from Dhaka helped me in my fieldwork. I had also visited the area from February 18 to 22, soon after the tribal insurgents from the area surrendered their arms to the Bangladesh Government on February 10, 1998. From Rangamati town, that houses both the district as well Forest Division headquarters, we went to Mynimukh (22° 59.226' N; 92° 12.226' E) about 60 km upstream northwards, along the Kassalong river by a motor launch. From there we travelled to Gulshakhali and then to Rangipara (22° 59.304' N; 92° 14.531' E) by motorboat. Mostly settlers live in these two spots. We met just two tribal Chakmas here, but were able to talk to a schoolteacher and a few local woodcutters. Later on, we moved to Pablakhali Wildlife Sanctuary (Fig. 1), about 10 km northeast of Mynimukh.

The Sanctuary's office is at a village called Amtali, which used to be a small outpost 20 years ago with only a tiny grocery shop. Everyone in the area used kerosene oil lanterns. Now it is a bustling town with nearly three dozen shops, a police station, high school and paramilitary camp. Two diesel-powered privately run generators supply electricity for 5 hours daily, from 5 p.m. to 10 p.m., to the shops at nominal charges. During the course of the survey, I met the concerned

forest officials responsible for CHT North and South Forest Divisions to get permission and assistance in the field. A Dhaka-based wildlife biologist, at least one Forest Department person, one tribal Chakma and one boatman accompanied us in all our surveys of the forest. They helped us to find our way through various watercourses and jungles as well as to communicate with the tribal people in certain areas.

We walked through forests and/or travelled by a slow-moving country boat fitted with an improvised diesel water pump. It followed watercourses surrounding the forests. We also searched inundated banks of the Kassalong river, which is the lifeline for all the forests surrounding it, and probable roosting-nesting sites of the WWD. In addition to this direct observation, several tribal Chakmas, living in all parts of the forest, plains-dwelling Bengali-speaking settlers and some 50 people visiting market places were also interviewed. We showed them the photograph of a WWD and enquired whether they had seen that particular duck, locally called 'Bhadi Hansh' by the tribal Chakmas. We told them its colour and size and explained to them where it usually lived.

Earlier reports of the WWD were mostly from a radius of 5 km from Amtali (23° 03.903' N; 92° 14.686' E). We surveyed the neighbourhood of Amtali during the afternoon and the whole of the next day, both on foot and by boat. We also talked to the villagers, fishermen and boatmen, mostly at night, in the market places where most men of the area gathered to gossip and shop.

On the 4th day, we travelled through Kassalong river and its flooded banks, a marshland where there was a report of the sighting of a pair of WWD by a passing European student, and stopped at several prospective WWD habitats at 23° 05.012' N, 92° 13.774' E; 23° 05.720' N, 92° 13.231' E; and 23° 06.906' N, 92° 13.034' E. We also prospected at the Nalbonia Beel (Beel = low-lying marshland in Bengali) where there was the possibility of its occurrence. We also stopped

and watched birds at Shishak Valley. We halted at Marishsha-Baghaichari — the last stop for a motor launch that plies between this and Rangamati town. It is also the headquarters for the Baghaichari Police Station. From there we went to a roughly 5 sq. km marshland named Ugalchari Beel or Lailla Ghona Beel (92° 12.453' E; 23° 08.467' N) and its neighbourhood, and also Bot Tali. Ugalchari village is entirely hilly and dominated by tribal Chakmas, while Bot Tali which is on the bank of Kassalong river is full of settlers. This Beel dries up in winter and is being used for rice cultivation by irrigation. At night we looked for frogs and talked to local folks.

Next morning we left Marishsha for Baghai Haat (23° 16.690' N; 92° 09.091' E). We travelled the first 20 km of the hill road by bus. Then we walked for 8 km to reach Baghai Haat where we stayed for two and a half days. By late afternoon we travelled another 6 km to Ganga Ram (23° 18.073' N; 92° 10.031' E), on the bank of Kassalong river, and the last stop on our journey — beyond this there was no road, and it was not safe for free movement as there was no law enforcing authority there.

From Baghai Haat we made short field trips in different directions and met tribal people who generally congregated in hundreds every Sunday at Baghai Haat to sell their products and to procure provisions.

#### RESULTS AND DISCUSSION

We did not come across any WWD not only in the Pablakhali Wildlife Sanctuary and its neighbourhood, but also in the entire valley of the Kassalong river up to Marishsha. These included three Beels or marshy areas — Nalbonia Beel, Shishak Valley and Ugalchari Beel. Of these, only the first one is known to hold some water all year round while the others dry up during winter and are used for cultivation of paddy and other winter crops.

Among the persons interviewed, only one Chakma villager from Dhoopchari Bazar, close to

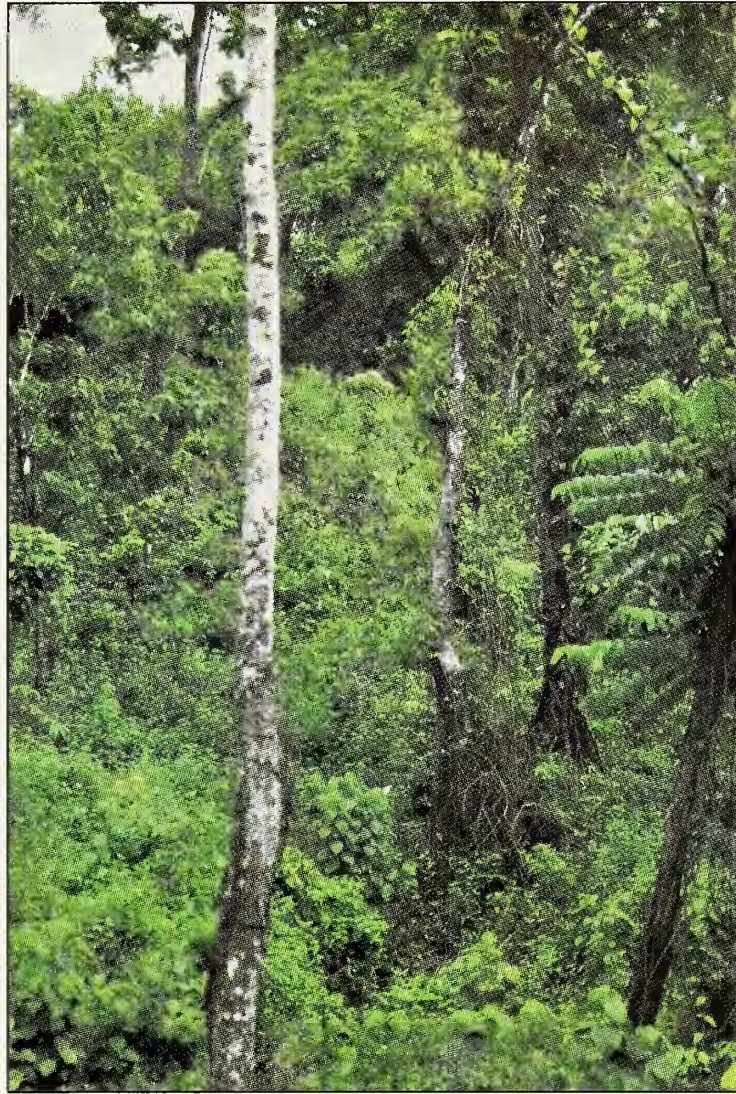


Fig. 1: There are no virgin Mixed Evergreen Forests in Bangladesh — this is one of the best patches with regenerated vegetation



Fig. 2: Tribal *jhum* cultivators have mercilessly cut the trees in the forest, planted paddy, and not even bothered to remove the logs

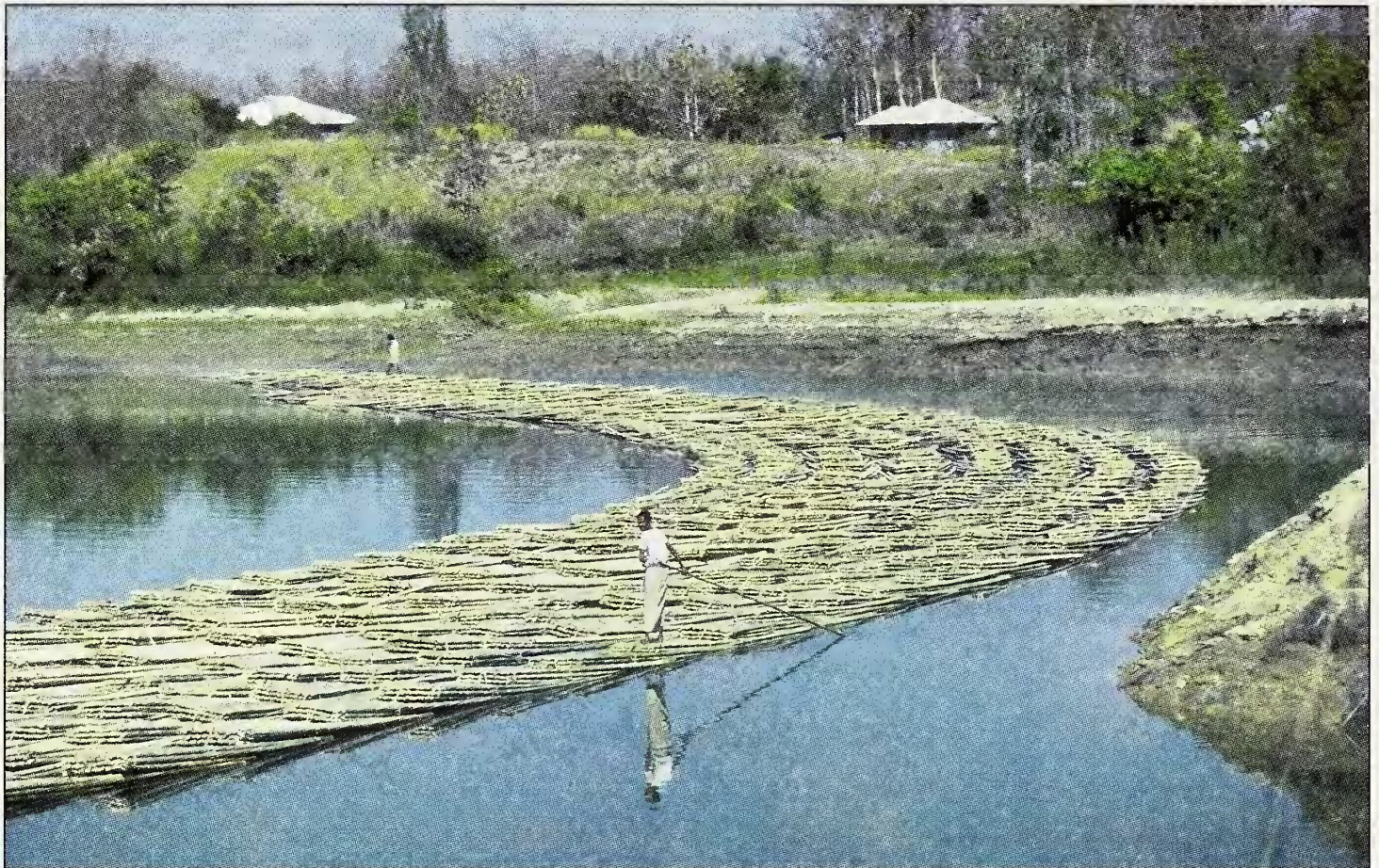


Fig. 3: Clearing reserved forest for housing plains-dwelling settlers and for *jhum* cultivation by the tribal settlers



Fig. 4: An officially banned brickfield stands out as a reminder of the ruthless large-scale destruction of the surrounding Mixed Evergreen Forest

the Sanctuary, said that he had seen a pair of WWD in Nalbonia Beel during the previous winter. However, we visited the same area and did not come across any WWD, though we saw a large flock of lesser whistling-duck *Dendrocygna javanica* and a pair of cotton teal *Nettapus coromandelianus* in the same area. We also noted bronze-winged jacana *Metopidius indicus* and chestnut bittern *Ixobrychus cinnamomeus*. There were many domesticated ducks, mostly mallards and muscovies.

As it was the breeding season for most of the fishes, an official fishing ban was in place. A few people were still fishing in the area for their livelihood, but the fish catch was too scanty to feed the local market. So, if there were WWD in the area, it would have been sighted by both Chakmas and Bengali fishermen. From Nalbonia Beel up to Ganga Ram, there was no report of sighting of the WWD.

There is only one recent record of sighting of a pair of WWD between Marishsha and Pablakhali Wildlife Sanctuary, by Neville J. Ash — a British student proceeding towards the Sanctuary searching for bears — on June 5, 1999 (c. 23° 10.000' N; 92° 20.000' E), according to Baz Hughes (of Threatened Waterfowl Specialist Group, Slimbridge, UK, pers. comm.). We did not see the duck there during the present survey.

Our past visits during the late 1970s and early '80s, and the present one, revealed a massive change in the pattern of avifauna distribution in the Sanctuary. First and foremost is the excessive abundance of mynas and starlings (*Acridotheres* spp. and *Sturnus* spp.). We came across too many common mynas (*A. tristis*) and Asian pied starlings (*S. contra*) that were very rare earlier and mostly restricted to human habitations. During the present visit, they were found in almost every part of whatever remains of old forests that have been largely converted into *jhum* cultivation through the process of slash and burn.

Another group, the bee-eaters, has flourished. We saw great numbers of blue-tailed

bee-eaters, small bee-eaters and chestnut-headed bee-eaters (*Merops philippinus*, *M. orientalis*, and *M. leschenaulti*) all along the watercourses. We also saw a blue-bearded bee-eater (*Nyctyornis athertoni*) sallying for dragonflies along an oxbow lake. We noted small blue and white-breasted kingfishers (*Alcedo atthis* and *Halcyon smyrnensis*) as very common, but missed stork-billed and oriental dwarf kingfishers (*H. capensis* and *Ceyx erithacus*) noted earlier.

Nearly a dozen species of woodpeckers used to live in this forest. We saw only three species (fulvous-breasted pied woodpecker *Dendrocopos macei*, lesser golden-backed woodpecker *Dinopium benghalense* and little scaly-bellied green woodpecker *Picus xanthopygaeus*) that are also common outside the forested area. We failed to notice any hornbill. Blue-throated and lineated barbets (*Megalaima asiatica* and *M. lineata*) seemed to be more common than the coppersmith or crimson-breasted barbet (*M. haemacephala*). We missed greater and lesser racket-tailed drongos (*Dicrurus paradiseus* and *D. remifer*) but black drongos (*D. macrocercus*) were very common. We noticed much fewer flycatchers and warblers than we saw two decades ago.

During the whole survey period, we had seen only two black-shouldered kites *Elanus caeruleus* at the Sanctuary, and also jungle owlet *Glaucidium radiatum*, spotted owlet *Athene brama*, Eurasian scops-owl *Otus scops* and brown hawk-owl *Ninox scutulata*, but no diurnal birds of prey. Among herons, only the Indian pond-heron *Ardeola grayii* was very common, while the chestnut bittern *Ixobrychus cinnamomeus* was not so common. We did not see any cormorant (*Phalacrocorax* spp.), little grebe (*Tachybaptus ruficollis*) or moorhens (*Porphyrio* sp. and *Gallinula* sp.).

The largest warbler in the area is the striated marsh-warbler *Megalurus palustris* and it was as common as before, but rewarding was the sighting of quite a few pied bushchats with juveniles

(*Saxicola caprata*). Red-vented bulbuls *Pycnonotus cafer* outnumbered all the forest bulbuls. Olive bulbul *Iole virescens* and red-whiskered bulbuls *Pycnonotus jocosus* were also common. Among flycatchers we saw a few black-naped monarch-flycatchers *Hypothymis azurea*, a niltava (*Niltava* sp.) and another blue flycatcher (*Muscicapa* sp.). Among sunbirds and flowerpeckers, the purple-rumped sunbird *Nectarinia zeylonica* and scarlet-backed flowerpecker *Dicaeum cruentatum* dominated the rest. The common iora *Aegithina tiphia* and oriental white-eye *Zosterops palpebrosus* were also very common.

Among mammals we observed the Irrawady squirrel *Callosciurus pygerythrus* to be the most common diurnal species. In addition, we noted Malayan giant squirrel *Ratufa bicolor*, rhesus macaque *Macaca mulatta*, a troop of capped langur *Trachypithecus pileatus*, a small herd of 5-6 elephants *Elephas maximus*, flying fox *Pteropus giganteus* and false vampire bat *Megaderma lyra* as common, and pygmy/Indian pipistrelle *Pipistrellus mimus* as a very common species.

The reptiles we noted included checkered keelback *Xenochrophis piscator*, common skink *Mabuya carinata*, Bengal/common Indian monitor *Varanus bengalensis* and common garden lizard *Calotes versicolor*.

Among frogs, we noted treefrogs *Polypedates leucomystax* and *P. maculatus*, common toad *Bufo melanostictus*, skipping frog *Euphlyctis cyanophlyctis*, Indian bull frog *Hoplobatrachus tigerinus*, cricket frog *Limnonectes limnocharis*, Boulenger's frog *Rana alticola*, ornate microhylid *Microhyla ornata* and red microhylid *Microhyla rubra*.

There appeared an appreciable change in the sightings of mammals and reptiles. We saw only one group of langurs and a pair of Malayan giant squirrels, and one each of *Calotes* and *Mabuya*. However, these species used to be common or very common in the 1970s and early 1980s.

#### CONSERVATION ISSUES

We may safely conclude that the WWD has disappeared from the Pablakhali Wildlife Sanctuary. Even if a stray pair or two are alive in some pockets, it is only a matter of time before these will either be trapped, netted, or hunted down with guns that have become freely available in the area.

If we try to find the reasons behind the disappearance of the WWD, we will arrive at the reasons for the large-scale destruction of other biodiversity from the region. The present study points out to several important but chronic causes. These are:

**Jhum cultivation:** This is the slash and burn process, of clearing a patch of natural forest and planting paddy and other cash crops, carried out by the tribals. Such a cleared field area is used alternately every 3rd or 4th year. The moment a forest is removed from an area, the topsoil is washed downhill by the monsoon rain. By repeated *jhum* cultivation, the soil loses its fertility and such fields are soon taken over by exotic plants or invasive local species of no commercial value. Such problematic species include the twiner *Mikania scandens*, shrubs such as *Eupatorium odoratum*, *Lantana camara* and thatching grass *Imperata arundinacea*.

Back in 1875, the then Conservator of Forests in Bengal, Sir William Schlich, noted that *jhum* cultivation was the enemy number one for the existence of natural forests in CHT District (based on Forest Department reports). The British, up to 1947, the East Pakistan authorities up to 1971, and the present Bangladesh authorities have not been successful in dissuading the tribal people from practising this slash and burn process of cultivation in all the three Hill Districts (Plate 1, Fig. 2).

**Clear-felling and monoculture:** The British, followed by the East Pakistan, and the present Bangladesh Forest Authorities, had and have one common goal in mind — to send more and more



revenue to the government exchequer by selling natural trees and other forest produce. This trend was consistent in the past and is continuing unabated to date. To do this they utilised the simple process of 'clear-felling' operations, on a predetermined basis prescribed in the 'Working Plan' prepared by a forest staff member for a Forest Division. In this process, all timber and commercially important species of trees are removed first, followed by planting of saplings of a single commercially viable species of timber such as teak (*Tectona grandis*), jarul (*Lagerstroemia reginae*), dipterocarp (*Dipterocarpus* spp.), jamun (*Syzygium cumini*), etc., as monocultures. Trees grown under monoculture are also removed on the basis of short or long rotations ranging from 20 to 60 years. The planting activities were assisted by tribal Chakmas and forest-villagers. In exchange for their labour, they would be allowed to burn all other plants from the monoculture area and start cultivating *jhum* rice and other crops. The *jhumias* stayed there for the first two years to take care of government forest while cultivating their own crop in the area. They also helped remove the weeds from the plantation. These processes resulted in the large-scale removal of natural forest, encouraged *jhum* cultivation in reserved forest area and allowed encroachment of forested land by the forest villagers (Plate 2, Fig. 3). At the end of it all, wildlife was wiped out from the area.

**Construction of Kaptai Dam:** Under a fund from USAID during 1959-63, the then East Pakistan Government constructed the Kaptai Hydroelectric Project with a view to generating 230 MW power for the country (now Bangladesh, after December 1971). Unfortunately in 1992, the power production in the project area went down to an all time low of 30 MW, due to shortage of water and filling up of both the lower and upper reaches of the lake by accumulated silt that resulted from deforestation in the hilly areas. When fully commissioned in 1962, the Project inundated an estimated area of 655 sq. km that included 40% of the best cultivable land in the former CHT District

(Gain 1995). Due to this project the Kaptai Lake — an artificial one — has been created. This dam has displaced at least 20,000 plough and *jhum* cultivating Chakmas from the Kassalong Valley. It destroyed an entire ecosystem from the valley floor up to about 10 m. This was a one time colossal loss of biodiversity in CHT.

The Chakmas and some settlers from the 1950s and early '60s allotment of valley lands, who were affected by the creation of the Kaptai Dam in 1965, were ultimately resettled in a section of the Kassalong Valley Reserve Forest in the late 1960s. This also destroyed the wildlife and its habitat.

**Negative management of wildlife:** Bangladesh Government ended all its responsibilities of managing the nation's wildlife wealth, by promulgating the Bangladesh Wildlife Preservation Order/Act 1973 and appointing a lone Senior Research Officer under the Forest Directorate. This person is now retiring in the same post, in a year or two. The Government has also declared a few areas as National Parks, Wildlife Sanctuaries, Game Reserves, Bird Sanctuaries, etc., under the above Act, as well as Biosphere Reserves and a World Heritage Site, under pressure from western donor countries. But all of these are only on paper and not in practice. The Government has utterly failed in managing the country's forests and wildlife (Plate 2, Fig. 4).

**Settlements:** Towards the end of the 1970s, the Bangladesh Government decided to settle plains-dwelling and Bengali-speaking people *en masse* in the Bandarban, Khagrachari and Rangamati Hill Districts, which traditionally used to be the home of the tribal people only. I understand, over a period of a decade or so, the Government was able to settle about 25,000 Bengali families in the hilly areas, including government-reserved forests. Each family was allotted a plot of 5 acres of hilly land, 4 acres of mixed land and 2.5 acres of paddy land (Gain 1995). These settlers first chopped and sold all valuable timber trees from their allocated areas and then

moved on to encroach upon more and more government forests as they had very little place to practise agriculture. It was an easy way of getting quick money by selling trees and other forest produce. Ultimately, they started encroaching upon both government revenue (*khas*) and forested lands. The population of the settlers must have doubled during the past two decades or so. Their demand for land and forest is never ending. Also, these people have negative social interaction with the tribal people due to cultural conflicts (Gain 1995).

**Tribal insurgency:** To counter the settlement of plains-dwelling Bengali people in the hilly areas of the erstwhile CHT District, a section of the tribal Chakmas formed a resistance group called 'Shanti Bahini' meaning Peace Force. This tribal insurgency continued roughly from 1980 to 1998. During the insurgency period, the Government brought in their counter-insurgency machinery such as the Military, Para Military BDR (Bangladesh Rifles), Police, Ansars, VDP (Village Defence Party), and a number of civil administrations. It is conjectured that during this long period, all sides and parties involved in the conflict destroyed forests and wildlife in an unabated fashion. The trend continued even after a peace deal was signed between the Shanti Bahini and Bangladesh Government in early 1998 when the tribals surrendered their arms. When I visited the area between February 18 and 22, 1998, and during the course of the present study, I documented the rampant destruction of forests and wildlife in the Sanctuary.

Presently it seems that nobody is in control of the CHT forests. It has become a free for all situation, with Chakmas and other tribals randomly cutting reserved forests and even government forests of monoculture just created in the 1990s, considering it to be their right. Taking advantage of the prevailing situation, the Bengali settlers are removing as many forest trees as possible to meet their daily needs as well as in greed. All law-enforcing authorities are apparently sitting idle.

Possibly, they do not like to get involved in any conflict. Overall, the social situation seems to be tense between the tribal Chakmas and Bengali settlers, as there is no free exchange between the two communities. Meanwhile, forest destruction and killing/capturing of wildlife are continuing unhindered.

#### RECOMMENDATIONS

- a. First of all, parties occupying the area must restore peace and tranquillity in the area without which there can be no development for either the Bengali-speaking settlers or the ethnic tribal people.
- b. Specifically for the WWD: If any duck of this species is captured it must be saved. The way to do this is to buy back the duck from the tribal Chakmas or Bengali settlers by bartering it for domesticated ducks. People who live in the area should be given material incentives to protect the WWD in their area. Domesticated ducks and poultry have good cash value and a certain number of these can be given to those families who live in the WWD area. This will allow the unhindered existence of the species.  
However, there must be a Government or NGO unit to facilitate these barter deals and oversee the project, from inception to implementation. This unit should ensure that sufficient funds are available to rehabilitate any ducklings produced. A certain number of ducklings can even be taken away to a few captive-breeding centres within the tribal area or outside it, with a view to bringing back the grown birds for reintroduction into the former range within the Sanctuary or its neighbourhood.
- c. *Jhum* cultivation should be restricted only to areas where *jhum* fields already exist. Further denudation of forest must be stopped, as tribals themselves are not likely to get any land in the future to practise *jhum* cultivation if the current trend continues.

- d. No new monoculture should be allowed. Instead, mixed species of indigenous trees should be planted and nurtured, with emphasis on fruit bearing and softwood trees that allow animals to get food and nesting opportunities. At least one third of the existing reserved forest should be declared as a Nature Reserve where forestry, agriculture or settlement activities of tribals or plains-dwellers should be stopped for at least half a century. This will allow the forest to regenerate on its own, and the biodiversity can get a foothold and revive to a certain extent.
- e. A separate Wildlife or Biodiversity Bureau should be created under the Environment and Forest Ministry. All lands declared previously as National Parks, Wildlife Sanctuaries, Game Reserves, Nature Reserves, World Heritage Site, Biosphere Reserves, etc., and to be so declared in the future, must be handed over to this new Bureau for their total management. These areas will have no administrative tie with the Environment or the Forest Department. This organisation is also to be banned from altering existing habitats for commercial purposes. Instead it must aim at scientific and sustainable management of biodiversity. It must try to practise sustainable utilisation of the natural resources.
- f. All zoos, wildlife research institutes and captive breeding centres existing in the country must be incorporated under this Wildlife Bureau.
- g. Top-level managers of the Bureau must be recruited at a national level, and have a wildlife background. Professionals from other disciplines such as Botany, Geology, Soil Science, etc., should also be involved in the activities of the Bureau. The rest of the manpower can be recruited locally. Only trained local people should be involved in the field level activities in all wildlife/biodiversity areas. No foreigners should be incorporated in the activities of the Bureau. However, foreign advisors can help the Bureau in future planning and project designing.
- h. The Bureau would be responsible for the development of wildlife/biodiversity curricula for all levels of education in the country.
- i. It should encourage ecotourism in all managed areas.
- j. It must enrich spoilt habitats by planting suitable indigenous tree species, especially those with soft, fleshy fruits and colourful, nectar producing flowers, various fig species and softwood trees suitable for hole-nesting animals.
- k. The Bureau must be active in raising public awareness campaigns. It must popularise Biodiversity Conservation in the country and take part in all activities of international bodies like the CITES Authority, IUCN - the Conservation Union, WWF (Worldwide Fund for Nature), and WAZA (World Association of Zoos and Aquariums).

#### ACKNOWLEDGEMENTS

I am grateful to the Bombay Natural History Society and the Honorary Secretary, Mr. J.C. Daniel for inviting me to submit this paper. I thank the Emirates Natural History Group, Abu Dhabi, UAE, and the Forum of Environmental Journalists of Bangladesh and Centre for Sustainable Development (CFSD), Dhaka, Bangladesh for sponsoring portions of my present study. Mohammad Mohoshinuzzan Chowdhury, a researcher from Dhaka was my constant companion for the entire fieldwork period. Conservator of Forests, Rangamati, Mr. Altaf Hossain, and DFO of CHT North Forest Division, Mr. Mamunur Rahman Chowdhury, provided me with necessary permission and local hospitality. I wish to thank them all. I am also thankful to Messrs Mahfuz Ullah of CFSD, Qamrul Islam, Chairperson of the FEJB, Shehabuddin Ahmed of the Daily Star, Mofizur Rahman of the Daily Janakantha, Chief Conservator of Forests, Mr. Mohammad Nuruzzaman, all the Foresters and many others

whom I wish to thank personally, who provided me valuable information regarding status of biodiversity and habitat destruction of the area covered by this survey. Dr. Baz Hughes, Chairman,

Threatened Waterfowl Specialist Group of IUCN/SSC, WWT, Slimbridge, U.K. gave me the latest information on the WWD. I am grateful to all of them for their generosity.

REFERENCES

- GAIN, P. (ED.) (1995): Bangladesh: Land, Forest and Forest People. Dhaka: Society for Environment and Human Development. xii + 163 pp.
- GREEN, A.J. (1993): The biology of the White-winged Duck *Cairina scutulata*. *Forktail* 8: 65-82.
- HUSAIN, K.Z. (1977): The White-winged Wood Duck. *Tigerpaper* (4): 6-8.
- HUSAIN, K.Z. (1985): Present status of the birds of Bangladesh. Proceedings, the Third East Asian Bird Protection Conference, Tokyo, Japan, 29-31 May, 1985. Wild Bird Society of Japan, Tokyo. Pp. 18-23.
- HUSAIN, K.Z. & M.N. HAQUE (1982): The White-winged Wood Duck Project: Report submitted to the University Grants Commission, Dhaka. Unpubl.
- IUCN BANGLADESH (2000): Red List of Threatened Animals of Bangladesh. IUCN-The World Conservation Union. xii + 54 pp.
- KHAN, M.A.R. (1981): The Endangered Birds of Bangladesh. *Newsletter for Birdwatchers* 21(12): 4-7.
- KHAN, M.A.R. (1982): Wildlife of Bangladesh-A Checklist. Dhaka University, Bangladesh.
- KHAN, M.A.R. (1983): The vanishing White-winged Wood Duck. *Bangladesh Today*, 16-30 June: 43-45.
- KHAN, M.A.R. (1986): The threatened White-winged Wood Duck *Cairina scutulata* in Bangladesh. *Forktail* 2: 97-101.

